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ENTRY AND EXIT IN INTERNATIONAL MARKETS: EVIDENCE FROM CHILEAN DATA*

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Abstract

Several studies examine the patterns and determinants of entry and exit in manufacturing industries. Not much work exists on entry and exit in international markets. This paper uses Chilean data to analyze the determinants of entry and exit in and out of export markets. We find that entry and exit rates differ across industries; vary over time; and are positively correlated. The econometric analysis shows that within-industry heterogeneity, measured by differences in productivity or other firm characteristics, has a significant effect on plant turnover in international markets. Our findings reveal that trade costs, factor intensities, and fluctuations in the real exchange rate play a minor role explaining entry and exit. This last result is consistent with hysteresis in international markets.

1. Introduction

There is an old tradition in the industrial organization literature studying industrial dynamic and firm turnover. Typical questions refer to whether the prevalent industry market structure determines different patterns of entry and exit.[1] The same emphasis, however, is not found in the context of entry and exit into and from international markets. Some articles study the probability of exporting at the plant-level,[2] but differences across industries remain largely unexplored. The objective of this paper is to fill this gap. We are interested in answering two questions: How do the patterns of entry and exit in international markets look like? And what are the main determinants of plant turnover in international markets? We address these questions using data from the manufacturing sector of Chile between 1990 and 1999.

The importance of these questions is evident. First, to the best of our knowledge these questions have not been analyzed in the literature up to now. And second, from a policy point of view, it is crucial to understand the patterns of entry and exit in external markets. As it is well known, many countries encourage exports and entry of new exporters with the idea that exports might fuel economic growth. But the effect of these policies may depend on specific characteristics of each industry.

Many export promotion programs provide incentives to entering exports markets, but how many of these new exporters will be able to survive? It may not be efficient to induce entry in industries characterized by a high probability of failure. Moreover, in which industries do we observe high turnover? Does turnover depend on the existence of

[1] See Geroski (1991) for a detailed exposition of theoretical and empirical approaches studying markets dynamics and entry. For a summary of empirical evidence, see Caves (1998) and Geroski (1995).

[2] See, for instance, Bernard and Jensen (2004a), and Alvarez and López (2005).

sunk entry costs? What is the role of firm heterogeneity? The design of export promotion may depend on the answer to these questions. If entry and exit depend on trade costs, public policies may be aimed to reduce these costs. By contrast, if entry and exit are the result of large differences in productivity between exporters and non exporters, then polices focusing only in facilitating entry may not generate increases in export participation if they are not accompanied by improvements in firms' productivity. Understanding these issues is relevant to assess the efficacy of export promotion.

Traditional theories, such as the Heckscher-Ohlin model, though not aimed to explain differences in entry and exit in international markets, would predict that these differences are attributable to the interaction between industries factor intensities and countries factor endowments. In a country relatively abundant in capital we should observe entry in capital-intensive industries, and exit in labor-intensive industries. The evidence that entry and exit rates are positively correlated is at odds with the factor endowments theory. As a country accumulates capital, we should observe higher entry in capital-intensive industries but not higher exit. Similarly to the industrial organization literature, the existence of sunk costs may be responsible for this positive correlation.[3]

Recent models of trade developed to match empirical evidence of firm export behavior are useful to explain entry and exit across industries. These models explain the existence of within-industry exporters and non-exporters by introducing firm productivity heterogeneity and trade costs. But with the exception of Bernard, Jensen and Schott (2003), no empirical evidence exists examining the predictions of these

[3] Roberts and Tybout (1997) and Bernard and Jensen (1999) document the existence of sunk costs of exporting, while Das, Roberts and Tybout (2001) use a structural model to estimate entry costs in the Colombian chemical industry. They find that such costs are large and vary across producers.

models. Then, in addition to factors intensities, we study whether plant heterogeneity and trade costs can explain the differences in export-market turnover across industries.

We uncover three main regularities or stylized facts. First, there is significant variation in entry and exit rates in international markets over time. Second, there are significant differences in entry and exit rates across industries. And third, entry and exit rates are positively correlated. We find that within-industry heterogeneity is the most important variable that explains differences in plant turnover. In contrast, trade costs, factor intensities, and the real exchange rate appear to play a minor role in explaining entry and exit in export markets.

2. Data

The empirical analysis is based on the Annual National Industrial Survey (ENIA) carried out by the National Institute of Statistics of Chile (INE) for the years 1990 through 1999. This survey covers the universe of Chilean manufacturing plants with 10 or more workers. A plant is not necessarily a firm; however, a significant percentage of firms in the survey are single-plant firms. The INE updates the survey annually by incorporating plants that start operating during the year and excluding those plants that stop operating.

Each plant has a unique identification number which allows us to identify entry and exit. For each plant and year, the ENIA collects information on production, value added, sales, employment and wages (production and non-production), exports, investment, depreciation, energy usage, foreign licenses, and other plant characteristics. In addition, plants are classified according to the International Standard Industrial

Classification (ISIC) rev 2.[4] Using 4-digit industry level price deflators, all monetary variables were converted to constant pesos of 1985. Plants do not report information on capital stock, thus it was necessary to construct this variable using the perpetual inventory method for each plant.

To measure productivity at the plant level we estimate a Cobb-Douglas production function for each 3-digit industry using the method proposed by Olley and Pakes (1996) and later modified by Levinsohn and Petrin (2003), which corrects the simultaneity bias associated with the fact that productivity is not observed by the econometrician but it may be observed by the firm. The residuals of these regressions are then used to measure productivity, or total factor productivity (TFP).

Table 1 shows the number of plants and exporters that appear in the ENIA between 1990 and 1999. The data set has almost 5,000 plants per year on average. From this number, 20.7 percent corresponds to exporter plants, i.e., plants that ship some of their output to international markets. The number of plants and the number of exporters do not change much during the period.

These numbers, however, hide significant entry and exit from the survey, and plant turnover in international markets. Table 2 shows the number of years plants appear in the survey and the number of years exporting. There are 8,242 plants but only 27.1% appear in the sample during the entire period. Many plants never export (73.3%), while only 3.3% of exporters (271 plants) do so during the 10 years of data. In other words, in addition to industry entry, there is important turnover in international markets.

[4] We dropped industries 314 (Tobacco) and 353 (Petroleum) because of the small number of plants in those sectors.

3. Patterns of Entry and Exit

The entry to and exit from international markets statistics are constructed for each 3-digit industry using the balanced panel, i.e., considering only plants that stay in operation during the entire period. The reason is that we want to focus exclusively on plant turnover in international markets and not on industry entry and exit. Moreover, many plants that enter or leave the sample are not necessarily new plants or shutdowns.[5] Although the number of plants that stay in operation during the entire period represents only 27% of the total number of plants that appear in the survey, their share in the manufacturing sector is significant: 57% in terms of employment, 61.3% in terms of value added, and 59% with regard to capital stock. For 1999, the final year of the sample, the numbers are even higher: 65% for employment, 74.8% for value added, and 69.7% for capital.

We define the entry rate to international markets for industry j as:

$$ERP_{jt} = \frac{NE_{jt}}{\overline{NP}_{jt}},$$

and the exit rate as:

$$XRP_{jt} = \frac{NX_{jt}}{\overline{NP}_{jt}},$$

where NE_{jt} is the number of plants that begin to export between years $t-1$ and t; NX_{jt} is the number of plants that stop exporting between years $t-1$ and t; and $\overline{NP}_{jt} = (1/2)[NP_{jt} + NP_{jt-1}]$, where NP_{jt} is the total number of plants in year t.

[5] Benavente and Ferrada (2003) discuss how false entries and exits may be associated to plants that reach employment levels above or below the threshold of 10 workers. In addition, entry and exit may also be the result of plants that were not located at the time of the survey; did not have movement of capital; had their operations paralyzed; were under investigation by the Internal Tax Service (SII); or had merged with another plant.

The entry rates, presented in Table 3, differ across industries ranging from zero (ceramics industry) to 8% (electrical machinery). Moreover, entry rates vary over time. Although there is a declining trend in the entry rate for the entire manufacturing industry (last row of Table 3), no clear pattern emerges for individual industries. In addition, with the exception of a few industries, such as food, most industries' entry rates are higher than the rates of the entire manufacturing industry.

Exit rates are presented in Table 4. We again observe differences across sectors: from zero (ceramics) to 6.1% (electrical machinery). There is also variation over the years but there is not a clear trend for the exit rate of the entire manufacturing industry, although it seems to increase slightly from 1991 to 1999. As with entry rates, most sectors have exit rates above the average.

Similar to studies on entry and exit in manufacturing industries,[6] we find that entry to and exit from international markets are highly correlated; the correlation coefficient between the average entry rates and the average exit rates across industries is 0.84. Figure 1 shows the average entry and exit rates for the period 1991-1999 at the 3-digit level. Industries with high entry rates to export markets have also high exit rates.

The patterns of entry and exit suggest that industry-specific characteristics are important factors explaining plant turnover. For this reason we examine how industry characteristics affect the diverse patterns of entry and exit in international markets.

[6] For the U.S., see for example, Dunne, Roberts, and Samuelson (1988); and Bernard and Jensen (2001). For developing countries, see the country studies in Roberts and Tybout (1996).

4. Empirical Strategy

We estimate an equation for the annual entry rate and one for the exit rate over the period 1991-1999. Since some industries have censored exit and entry rates, we use Tobit specifications of the form:

(1) $$ERP_{jt} = \alpha + \beta' Z_{jt-1} + \delta_t + \varepsilon_{jt} ,$$

(2) $$XRP_{jt} = \alpha + \beta' Z_{jt-1} + \delta_t + \varepsilon_{jt} ,$$

where Z_{jt-1} is a vector of industry characteristics lagged one period, and δ_t is a set of year dummies to control for aggregate time-specific effects. The explanatory variables (Z's) are grouped in four categories: (i) industry factor intensities, (ii) trade costs, (iii) within-industry heterogeneity, and (iv) real exchange rates.

(i) Industry Factor Intensities

Consistent with factor endowments driven specialization, we expect entry (exit) to be concentrated in comparative advantage (disadvantage) industries. In the case of a country relatively scarce in physical and human capital, like Chile, comparative advantage industries are those that use these factors less intensively. We expect higher entry in industries with lower physical and human capital intensity, and higher exit in more capital and skill intensive industries.

The measure of industry physical capital intensity is the log of capital per worker of the median plant in the industry (KL). For skill intensity (SKILL) we use the share of non-production wages in total wages of the median plant in the industry. Figure 2 shows the correlation between entry, exit, and these factor intensities. It appears that entry and exit rates are positively correlated with the factor intensities.

(ii) Trade Costs

In recent models of trade with firm heterogeneity (e.g., Melitz, 2003; Bernard et al, 2003), the existence of trade costs explain endogenously why more productive plants export and less productive plants only sell in domestic markets. Analogously to the role of sunk costs in models of industry dynamics in closed economies, trade costs contribute to explain patterns of entry and exit within and between industries. The prediction of these models is that a reduction in trade costs increases entry and exit. Trade costs reductions increase export profitability; thus more productive firms enter international markets generating an upward pressure on factor prices that makes exports unprofitable for the less productive firms. As a result, entry and exit tend to be positively correlated.

It is difficult to obtain direct estimates of trade costs at the plant- and industry-level. Bernard, Jensen, and Schott (2003) find direct measures of trade costs for U.S. industries by using U.S. imports tariffs and transportation costs. Others, as Redding and Venables (2003), obtain indirect trade costs measures by estimating a gravity equation. In the absence of direct measures, we use two proxies for trade costs. First, we compute the mean of the number of exported products by firms at the industry level.[7] We then define low and high trade costs industries using the industry median of this variable as a threshold. Our dummy variable for low trade costs (LTC) identifies industries exporting more products than the median industry. The assumption is that exporting a large number of products reflects low exporting costs. The idea is that there are fixed costs of introducing new products to export markets, such as cost of advertising and developing new marketing techniques, information costs regarding foreign demand

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[7] Products are defined at 10-digit harmonized system. This information was provided by the National Agency for Export Promotion of Chile (ProChile) and details firm exports by markets and products. Unfortunately, both datasets could not be merged because the ENIA surveys plants not firms.

conditions, and costs of establishing a distribution system. Then, in industries where these costs are more important, we should observe firms exporting a lower number of products. We then expect the LTC variable to be positively correlated with entry and exit.

The second proxy for trade costs is the expenditure in advertisement over sales (ADV). To be sure that we are capturing product differentiation in export markets, we use the advertisement ratio only for exporters in the industry. This variable is a proxy for the degree of product differentiation. In the industrial organization literature, it is commonly argued that it is difficult for new firms to enter and obtain reputation in industries highly intensive in advertisement and promotion. Then, product differentiation is thought to constitute a barrier to entry.[8] In the specific case of international markets, Rauch (1999) explains that trade costs tend to be larger in industries with higher product differentiation because more search costs are incurred by firms and consumers; in contrast, for homogeneous products that are sold in organized markets entry costs should be lower. Then, we expect that a higher intensity in advertisement increases trade costs, and reduces entry and exit rates.

(iii) Within-industry Heterogeneity

In models with firm heterogeneity two productivity thresholds identify plant market orientation. Due to the existence of trade costs, the higher productivity threshold is for exporting firms. Only for firms with productivity equal or above this level exporting is profitable. The lower productivity threshold identifies firms obtaining zero profits for selling only in the domestic market. Firms with productivity below this threshold exit

[8] Indeed one of the stylized facts summarized by Geroski (1995) is that entry costs rise with industry advertising intensity.

immediately. Then, we are interested in testing if the larger the distance between both thresholds the lower the entry rate and the larger the exit rate.

To proxy the within-industry heterogeneity, we calculate the median difference in total factor productivity (DIFF-TFP), skills (DIFF-SKILL), capital per worker (DIFF-KL), and size (DIFF-SIZE) between exporters and non-exporters.[9] For total factor productivity, size, and capital per worker, this variable is computed as: $DIFF - Y = Median(\log Y^{X}) - Median(\log Y^{NX})$, where Y is the variable of interest (e.g. TFP). For skills, it is the difference between the median of both groups. The median is used to eliminate potential outliers that may generate distortions when using mean differences.

Since these variables are highly correlated, they are included separately in the regressions. For all these variables, we expect a negative parameter in the case of entry. If exporters are more productive (or larger, or more capital intensive) than non-exporters, there is a higher productivity threshold for entering international markets which diminishes entry rates. For the same reason, entrants are more likely to fail where differences between exporters and non-exporters are larger. Then, we expect a positive impact of within-industry heterogeneity on exit rates.

(iv) Real Exchange Rates

We also study the impact of fluctuations in the real exchange rate. The motivation is provided by the literature on hysteresis which develops the idea that in the presence of trade costs optimizing firms do not necessarily exit foreign markets when current profits fall.[10] This is because firms compare current losses with the costs of entering foreign markets later. Thus, a real depreciation may not induce entry if the present value of

[9] Our measure of size is total employment.
[10] See Baldwin and Krugman (1989), and Dixit (1989).

profits is not larger than the entry costs. Only large and persistent fluctuations in real exchange rates should induce changes in entry and exit decisions.

We compute sector-level real exchange rates. The log of the real exchange rate for industry j at time t is calculated as:

$$\log(RER_{jt}) = \log\left(\sum_{c=1}^{C} \alpha_{cj} RER_{ct}\right),$$

where RER_{ct} is the bilateral real exchange rate between Chile and country c;[11] $C=15$ is the number of countries; and α_{cj} is defined as:

$$\alpha_{cj} = \frac{1}{T}\sum_{t=1}^{T} \frac{Exports_{cjt}}{Exports_{jt}} \quad ,$$

where $Exports_{cjt}$ is the value of exports from industry j to country c at time t; $Exports_{jt}$ is the value of exports from industry j at time t; and T is the number of periods (9 years). In other words, the real exchange rate is a weighted average of bilateral real exchange rate indices between Chile and the 15 main countries of destination of Chilean exports for each industry.

If real exchange rate fluctuations are an important source of changes in exports profitability, we expect a positive (negative) sign for entry (exit) because exchange rate depreciations (appreciations) increase (reduce) returns to exporting. But as we mentioned before, only large and persistent fluctuations would be responsible for changes in entry and exit decisions.

[11] The bilateral real exchange rate between Chile and country c is: $RER_{ct}=NomER_{ct}*P_{ct}/P_{Chile,t}$. $NomER_{ct}$ is the nominal exchange rate between Chile and country c (Chilean pesos / country's c currency), while P_{ct} and $P_{Chile,t}$ are producer price level indices for country c and Chile, respectively. The nominal exchange rates and producer prices were obtained from the International Financial Statistics of the International Monetary Fund. In cases in which the producer price was not available the consumer price index was used.

In Chile, exchange rate fluctuations may explain entry and exit because there was a sustained real appreciation in most of the period. The magnitude of this appreciation, however, differs across industries. Although the economy-wide real exchange rate appreciated considerably, this is not the case for all manufacturing industries. Figure 3 shows that the real exchange rate for the food industry displays a similar trend than the economy-wide real exchange rate, but the real exchange rate for textiles shows a different pattern; after an increase in 1993, it tended to stabilize at higher values than at the beginning of the period. We want to explore whether these across-industries differences can explain variations in entry and exit rates.

There is one estimation issue we need to address. There are unobserved industry characteristics that may affect entry end exit. To control for this unobserved heterogeneity we follow two methods. We first include a full set of industry dummy variables in the estimation of equations (1) and (2). Since we are adding a considerable number of parameters relative to the number of observations the estimates of the parameters in the β vector might be inconsistent. For this reason we also estimate a random effects Tobit model. This method should most likely gives us consistent estimates in the presence of unobserved heterogeneity (Wooldrige, 2002, Chapter 16). By estimating the model using both methods, we can check how robust the findings are.

5. Results

5.1 Basic Results

Table 5 presents the estimates for (1) and (2) with industry dummies, while Table 6 shows the random effects Tobit estimates. Columns (1)-(4) for entry rates and (6)-(9)

for exit rates differ in the proxy for the within-industry heterogeneity. Consider first the results with industry dummies. As we can see in Table 5 we find some, although weak, evidence that skill-intensity affects entry and exit rates. In the case of entry, the parameter turns out to be always negative, as expected, but is significant only in two out of five cases. For exit rates, the parameter has the expected sign but is never significant.

Physical-capital intensity, however, appears to increase both entry and exit rates. Although this result, based on the Heckscher-Ohlin model, is expected for exit, we expected a negative correlation for entry. Nevertheless, this last result may be compatible by considering a third factor: natural resources. Chilean comparative advantage is mainly in industries linked to natural resources, many of which are relatively more capital-intensive than industries that substitute imports (for example, apparel). According to our calculations, natural resource intensive industries are almost twice as capital intensive as the rest of manufacturing industries.

With respect to trade costs, the results are consistent with predictions of recent trade models. Lower trade costs are associated with higher entry and exit rates.[12] This may explain why on average entry and exit rates are positively correlated across industries. The measure of product differentiation is not significant for entry rates, but negative and significant for exit. This implies that product differentiation may be not a barrier for entry, but it may be a significant barrier for plant survival in international markets.

We also find strong evidence that within-industry heterogeneity is relevant to explain international markets turnover. A higher degree of heterogeneity -either measured by differences in TFP, skills, capital per worker, or size- decreases entry and

[12] This variable, however, is only significant for entry rates.

increases exit. This is consistent with predictions of recent models that emphasize the importance of within industry heterogeneity and exporting costs to understand plant export performance.

In terms of real exchange rate fluctuations, the estimates show that they can not explain differences in turnover across industries. This is consistent with hysteresis. As suggested by theoretical models and firm-level evidence, export status tends to be persistent in the presence of trade costs. This is in line with recent findings by Bernard and Jensen (2004b), which show that the effect of real exchange rate fluctuations on export intensities of existing exporters is greater than the effect on exports by new exporters in the U.S. Finally, in columns (5) and (10) we check if the impact of real exchange rate is different for industries with low trade costs, by including the real exchange rate interacted with the dummy variable for low-trade-cost industries. The estimate for this interaction term is not significant and does not affect the magnitude or the significance of the other variables. The evidence of a null impact of the real exchange rate is robust to alternative specifications. First, we include the rate of change instead of the level. Second, we analyze if there are asymmetries depending on whether there is an appreciation or depreciation of the real exchange rate. Third, we include a dummy variable for "large" appreciations or depreciations.[13] In all cases, there is no evidence of significant impact of the real exchange rate on the patterns of entry and exit.[14]

[13] "Large" refers to increases (or reductions) larger than that of the superior (or inferior) 25% of the distribution.

[14] This result does not imply that real exchange rate is irrelevant for explaining export performance. In fact, in unreported estimations, we uncover a significant relationship between the real exchange rate and export shares. Thus, exchange rate fluctuations appear more likely to change the intensive margin (sales of existing exporting firms) rather than the extensive margin (changes in the number of exporting firms).

Consider now the estimates from the random effects Tobit model in Table 6. Several variables become no statistically significant. In the case of entry, only the capital-labor ratio and the measures of within-industry heterogeneity are statistically significant. For the exit rates, only the within-industry heterogeneity appears to be important. These results suggest that within industry heterogeneity is the most relevant factor explaining entry and exit in export markets.

5.2 Extension: Including Lags of Entry and Exit

It is possible that entry and exit are correlated with past exit and entry. Suppose there is an increase in entry to export markets in a given year. This may increase the demand for, and the cost of, labor or some specialized inputs used by exporters, so that the less productive exporters are forced to exit the following period. We call this situation "competition effect." A similar argument may be posed for the effect of previous exit on entry.

Likewise, entry and exit may be also correlated with their own past values, although it is not clear whether the correlation is positive or negative. Consider the case of entry. Entry of new exporters may generate information about international markets that may be used by potential exporters (spillover effect), so high entry could facilitate entry in the following period.[15] But the opposite result is also possible. Suppose that

[15] The evidence on spillover effects is, however, inconclusive. For example, some studies do not find that industry export activity increases the probability of exporting of non-exporters (e.g. Clerides et al., 1998; Barrios et al., 2003; Bernard and Jensen, 2004a). Others find that only multinational exporters generate this type of spillovers (e.g. Aitken et al., 1997; Greenaway, et al., 2004; Ruane and Sutherland, 2005).

entry of new exporters increases the costs of inputs used for exporting, then entry during the following period could decrease.[16]

Table 7 and 8 show the results of estimating (1) and (2) including the lags of entry and exit rates. All the results obtained previously are robust to the inclusion of these additional variables. In terms of the lagged variables, we find that entry is positively correlated with past exit, and exit is positively correlated with past entry. This is consistent with the competition effect we mentioned before. The correlation between entry and exit rates with their corresponding lags is much weaker. Entry is negatively correlated with past entry if we use industry dummies, but positively correlated if we use random effects. Nevertheless, in most cases the correlation is not significant. For exit, the results are ambiguous too. In some cases the correlation is positive but in others is negative, and when significant it is only at 10%. These results, however, are in line with the ambiguous a priori predictions we discussed.

6. Conclusions

While several empirical studies examine the patterns of entry and exit in manufacturing industries, no work exists analyzing the patterns and determinants of entry to and exit from international markets. Using data from the manufacturing sector of Chile between 1990 and 1999 we attempt to fill this gap.

We start by documenting three main stylized facts of plant turnover in international markets: Entry and exit in international markets differ across industries; vary over time; and are positively correlated.

[16] Karpaty and Kneller (2005) find evidence on this regard, showing that entry of multinationals in Sweden decreased the probability of exporting for domestic firms.

Based on traditional trade models, and recent theoretical contributions linking export participation with firm heterogeneity, we analyze several possible explanations for the differences in entry and exit rates. We find that within-industry heterogeneity, measured either by differences in productivity or other firm characteristics, has a significant effect on plant turnover in international markets. Our findings reveal that trade costs and factor intensities play a minor role explaining entry and exit. In addition, we do not find evidence of significant effects of changes in the real exchange rate on entry and exit rates, which is consistent with the existence of hysteresis in the patterns of participation in international markets.

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TABLE 1: Number of Plants and Exporters, 1990-1999

	Number of Plants	Exporters	
		Number	Percentage
1990	4,584	760	16.6
1991	4,764	913	19.2
1992	4,937	982	19.9
1993	5,041	1,056	20.9
1994	5,081	1,114	21.9
1995	5,111	1,133	22.2
1996	5,465	1,169	21.4
1997	5,241	1,141	21.8
1998	4,818	1,053	21.9
1999	4,402	918	20.9
Average	4,944	1,024	20.7

Source: Authors' calculations based on plant-level data.

TABLE 2: Plants in the Panel and Years of Exporting

Number of Years	Plants in the Panel		Years of Exporting	
	Number	Percentage	Number	Percentage
0	-	-	6,040	73.3
1	958	11.6	483	5.9
2	748	9.1	304	3.7
3	790	9.6	241	2.9
4	783	9.5	187	2.3
5	572	6.9	159	1.9
6	503	6.1	142	1.7
7	542	6.6	141	1.7
8	531	6.4	133	1.6
9	582	7.1	141	1.7
10	2,233	27.1	271	3.3
Total	8,242	100.0	8,242	100.0

Source: Authors' calculations based on plant-level data.
Plants in the panel: The number (and percentage) of plants that stayed in the panel for a total of 1, 2, 3, etc. years. Years of Exporting: The number (and percentage) of plants that exported for a total of 0, 1, 2, etc. years.

TABLE 3: Entry Rates in International Markets, 1991-1999
(Percentages)

	1991	1992	1993	1994	1995	1996	1997	1998	1999	Average
Food	2.2	2.8	1.3	1.5	1.2	0.7	1.0	0.6	1.0	1.4
Food – Miscellaneous	14.3	4.8	4.8	0.0	11.6	2.3	2.3	2.4	2.4	5.0
Beverages	2.2	2.2	4.3	4.3	4.3	8.7	0.0	2.2	2.2	3.4
Textiles	13.4	4.7	5.4	6.6	2.4	6.1	4.3	1.9	3.7	5.4
Apparel	5.5	7.2	2.6	2.6	3.5	2.7	4.4	3.5	0.0	3.5
Leather Products	9.8	4.9	0.0	10.3	4.9	14.3	0.0	0.0	0.0	4.9
Footwear	11.5	3.3	0.0	1.7	3.3	3.3	4.8	3.2	0.0	3.4
Wood Products	4.6	5.3	3.8	3.1	1.5	3.0	1.5	0.0	0.8	2.6
Furniture	2.0	8.0	0.0	3.7	0.0	4.2	0.0	4.1	4.0	2.9
Paper	5.8	2.9	0.0	9.7	2.9	13.7	2.8	5.8	0.0	4.8
Printing	0.0	3.9	3.8	5.7	1.0	2.9	1.9	0.9	2.8	2.5
Industrial Chemicals	0.0	6.1	12.5	0.0	12.5	6.1	5.8	0.0	0.0	4.8
Other Chemicals	14.8	6.3	8.5	4.2	3.2	2.1	4.4	1.1	2.2	5.2
Petroleum Products	10.5	0.0	10.5	0.0	0.0	0.0	22.2	11.8	12.5	7.5
Rubber Products	0.0	3.5	6.9	0.0	3.4	0.0	3.3	0.0	0.0	1.9
Plastics	7.4	9.5	8.5	4.7	3.9	8.2	8.3	5.1	3.1	6.5
Ceramics	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Glass	0.0	0.0	0.0	0.0	0.0	13.8	0.0	0.0	0.0	1.5
Non-metallic Minerals	0.0	4.6	0.0	0.0	3.0	1.5	0.0	1.5	0.0	1.2
Iron and Steel	10.8	0.0	6.3	0.0	6.3	7.1	7.4	0.0	0.0	4.2
Non-ferrous Metals	7.7	0.0	8.0	8.0	0.0	6.9	0.0	0.0	0.0	3.4
Metal Products	7.5	3.2	4.3	3.2	1.6	4.1	3.1	4.5	2.5	3.8
Non-electrical Machinery	5.0	3.8	3.8	5.0	5.0	2.5	5.0	1.2	2.4	3.8
Electrical Machinery	13.8	3.3	16.1	6.8	3.6	14.3	10.5	0.0	3.4	8.0
Transport Equipment	6.0	6.0	6.1	4.0	4.1	4.1	0.0	8.2	4.2	4.7
Professional Equipment	27.3	0.0	17.4	0.0	0.0	7.7	0.0	0.0	9.1	6.8
Other Manufacturing	3.2	3.1	6.2	6.3	0.0	5.7	5.6	2.7	0.0	3.6
Manufacturing Sector	5.6	4.2	3.8	3.1	2.5	3.5	2.8	1.9	1.7	3.2

Source: Authors' calculations based on plant-level data.

TABLE 4: Exit Rates in International Markets, 1991-1999
(Percentages)

	1991	1992	1993	1994	1995	1996	1997	1998	1999	Average
Food	1.6	1.2	1.2	1.6	1.0	1.2	0.6	1.3	1.3	1.2
Food – Miscellaneous	2.4	2.4	2.4	7.1	0.0	2.3	7.0	4.7	4.7	3.7
Beverages	8.7	0.0	0.0	0.0	2.2	0.0	2.2	2.2	2.2	1.9
Textiles	0.6	5.3	4.8	2.4	4.8	3.6	3.1	3.7	6.8	3.9
Apparel	1.8	0.9	1.8	3.5	4.4	3.6	2.6	1.7	5.2	2.8
Leather Products	0.0	0.0	0.0	0.0	0.0	4.8	9.5	0.0	5.1	2.2
Footwear	1.6	4.9	3.3	0.0	3.3	8.1	4.8	4.8	3.2	3.8
Wood Products	5.3	3.8	2.3	3.1	3.8	2.2	0.7	0.7	1.5	2.6
Furniture	7.9	2.0	7.7	1.8	3.8	0.0	4.3	4.1	2.0	3.7
Paper	2.9	0.0	0.0	3.2	2.9	2.7	0.0	2.9	5.8	2.3
Printing	1.0	1.9	2.8	2.8	2.0	1.9	0.0	1.9	5.6	2.2
Industrial Chemicals	2.9	6.1	6.3	3.2	3.1	9.1	8.7	5.9	5.9	5.7
Other Chemicals	4.2	7.4	1.1	5.3	2.1	4.3	0.0	6.7	5.6	4.1
Petroleum Products	0.0	0.0	0.0	0.0	10.5	22.2	0.0	11.8	0.0	4.9
Rubber Products	3.4	0.0	3.4	0.0	0.0	3.4	0.0	0.0	0.0	1.1
Plastics	5.6	4.7	1.9	2.8	4.9	10.3	7.3	4.1	9.3	5.6
Ceramics	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Glass	0.0	0.0	8.3	7.4	0.0	0.0	0.0	0.0	8.3	2.7
Non-metallic Minerals	0.0	1.5	1.5	4.4	0.0	0.0	0.0	3.0	0.0	1.2
Iron and Steel	0.0	5.7	0.0	6.1	0.0	7.1	0.0	8.0	7.7	3.8
Non-ferrous Metals	0.0	0.0	8.0	0.0	7.7	0.0	0.0	0.0	0.0	1.7
Metal Products	2.1	4.2	3.7	2.2	1.6	1.6	3.6	3.0	2.0	2.7
Non-electrical Machinery	2.5	1.3	0.0	3.7	3.8	5.0	1.2	4.9	2.4	2.8
Electrical Machinery	0.0	6.7	3.2	6.8	7.1	7.1	3.5	10.0	10.3	6.1
Transport Equipment	0.0	2.0	6.1	2.0	4.1	2.0	2.1	2.1	6.3	3.0
Professional Equipment	9.1	17.4	0.0	8.3	7.7	0.0	0.0	0.0	0.0	4.7
Other Manufacturing	3.2	3.1	0.0	3.1	3.0	0.0	2.8	2.7	8.6	3.0
Manufacturing Sector	2.4	2.7	2.3	2.6	2.5	2.8	2.0	2.8	3.4	2.6

Source: Authors' calculations based on plant-level data.

TABLE 5: Determinants of Entry and Exit Rates – Tobit with Industry Dummies

	Entry Rates					*Exit Rates*				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
RER	0.015	0.018	0.012	0.014	0.026	0.031	0.029	0.033	0.032	0.014
	(0.53)	(0.64)	(0.44)	(0.48)	(0.70)	(1.34)	(1.25)	(1.45)	(1.40)	(0.50)
KL	0.043	0.048	0.051	0.047	0.043	0.026	0.023	0.021	0.023	0.025
	(2.67)***	(2.96)***	(3.24)***	(2.89)***	(2.67)***	(1.99)**	(1.78)*	(1.65)*	(1.76)*	(1.98)**
Skills	-0.131	-0.103	-0.170	-0.113	-0.138	0.036	0.016	0.048	0.021	0.048
	(1.62)	(1.29)	(2.16)**	(1.41)	(1.68)*	(0.57)	(0.26)	(0.77)	(0.34)	(0.74)
LTCP	0.074	0.073	0.074	0.083	0.156	0.037	0.038	0.039	0.030	-0.253
	(2.63)***	(2.64)***	(2.75)***	(2.93)***	(0.70)	(1.65)*	(1.73)*	(1.81)*	(1.33)	(1.41)
Advertisement	3.429	2.962	1.955	3.021	3.440	-7.499	-7.079	-6.293	-7.182	-7.533
	(0.96)	(0.84)	(0.57)	(0.85)	(0.96)	(2.48)**	(2.37)**	(2.12)**	(2.38)**	(2.49)**
Diff. in TFP	-0.005				-0.005	0.004				0.004
	(4.25)***				(4.24)***	(4.34)***				(4.34)***
Diff. in size		-0.010					0.008			
		(4.67)***					(4.56)***			
Diff. in skills			-0.141					0.097		
			(5.97)***					(5.07)***		
Diff. in K/L				-0.005					0.004	
				(4.43)***					(4.30)***	
RER*LTCP					-0.021					0.036
					(0.46)					(0.95)
Constant	-0.353	-0.406	-0.372	-0.375	-0.401	-0.276	-0.246	-0.268	-0.264	-0.204
	(2.20)**	(2.52)**	(2.40)**	(2.33)**	(2.09)**	(2.14)**	(1.90)*	(2.10)**	(2.03)**	(1.36)
Observations	243	243	243	243	243	243	243	243	243	243

Absolute value of t statistics in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

TABLE 6: Determinants of Entry and Exit Rates – Tobit with Random Effects

	Entry Rates					*Exit Rates*				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
RER	0.008	0.010	0.011	0.007	0.012	0.027	0.027	0.028	0.028	0.011
	(0.28)	(0.35)	(0.38)	(0.26)	(0.34)	(1.15)	(1.14)	(1.19)	(1.17)	(0.37)
KL	0.026	0.028	0.034	0.027	0.026	0.009	0.008	0.007	0.008	0.009
	(2.88)***	(3.14)***	(3.38)***	(3.00)***	(2.88)***	(1.22)	(1.10)	(0.88)	(1.06)	(1.18)
Skills	-0.007	0.016	-0.028	0.003	-0.008	-0.026	-0.032	-0.023	-0.032	-0.022
	(0.12)	(0.28)	(0.46)	(0.06)	(0.13)	(0.55)	(0.66)	(0.48)	(0.66)	(0.46)
LTCP	0.011	0.016	0.016	0.014	0.052	0.006	0.003	0.003	0.003	-0.162
	(1.05)	(1.61)	(1.41)	(1.43)	(0.24)	(0.59)	(0.31)	(0.29)	(0.33)	(0.90)
Advertisement	2.196	1.481	1.223	1.809	2.181	-2.409	-2.231	-2.035	-2.258	-2.358
	(0.94)	(0.66)	(0.51)	(0.78)	(0.93)	(1.09)	(0.99)	(0.89)	(1.02)	(1.07)
Diff. in TFP	-0.004				-0.004	0.002				0.002
	(3.96)***				(3.96)***	(2.32)**				(2.29)**
Diff. in size		-0.008					0.004			
		(4.69)***					(2.30)**			
Diff. in skills			-0.096					0.048		
			(4.66)***					(2.56)**		
Diff. in K/L				-0.004					0.002	
				(4.16)***					(2.49)**	
RER*LTCP					-0.009					0.036
					(0.19)					(0.93)
Constant	-0.237	-0.267	-0.293	-0.246	-0.257	-0.139	-0.130	-0.128	-0.131	-0.064
	(1.63)	(1.85)*	(2.03)**	(1.70)*	(1.42)	(1.16)	(1.08)	(1.08)	(1.09)	(0.44)
Observations	243	243	243	243	243	243	243	243	243	243

Absolute value of z statistics in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

TABLE 7: Determinants of Entry and Exit Rates with Lags of Entry and Exit – Tobit with Industry Dummies

	Entry Rates					*Exit Rates*				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Lag of Entry	-0.133	-0.139	-0.128	-0.142	-0.133	0.172	0.189	0.180	0.190	0.174
	(1.64)	(1.72)*	(1.60)	(1.75)*	(1.63)	(2.48)**	(2.76)***	(2.67)***	(2.76)***	(2.51)**
Lag of Exit	0.375	0.347	0.338	0.353	0.375	-0.033	0.010	0.000	-0.009	-0.035
	(3.69)***	(3.36)***	(3.35)***	(3.43)***	(3.68)***	(0.35)	(0.10)	(0.00)	(0.10)	(0.38)
RER	-0.028	-0.025	-0.028	-0.027	-0.030	-0.007	-0.010	-0.007	-0.007	-0.016
	(0.86)	(0.76)	(0.89)	(0.85)	(0.74)	(0.26)	(0.36)	(0.24)	(0.24)	(0.46)
KL	0.040	0.042	0.045	0.042	0.040	0.027	0.026	0.025	0.026	0.027
	(2.48)**	(2.57)**	(2.76)***	(2.56)**	(2.49)**	(1.95)*	(1.81)*	(1.76)*	(1.80)*	(1.95)*
Skills	-0.046	-0.031	-0.073	-0.036	-0.045	0.065	0.049	0.076	0.051	0.069
	(0.58)	(0.39)	(0.92)	(0.46)	(0.57)	(0.96)	(0.73)	(1.14)	(0.75)	(1.01)
LTCP	0.067	0.066	0.064	0.072	-0.016	0.032	0.033	0.037	0.027	-0.184
	(2.45)**	(2.40)**	(2.42)**	(2.59)***	(0.07)	(1.36)	(1.40)	(1.59)	(1.11)	(0.90)
Advertisement	1.703	1.063	1.054	1.156	1.697	-6.682	-5.932	-5.912	-6.046	-6.700
	(0.49)	(0.31)	(0.31)	(0.34)	(0.49)	(2.04)**	(1.85)*	(1.83)*	(1.86)*	(2.05)**
Diff. in TFP	-0.003				-0.003	0.004				0.004
	(3.06)***				(3.06)***	(3.80)**				(3.78)***
Diff. in size		-0.006					0.007			
		(2.92)***					(3.73)***			
Diff. in skills			-0.100					0.098		
			(4.08)***					(4.51)***		
Diff. in K/L				-0.003					0.003	
				(2.91)***					(3.49)***	
RER*LTCP					0.004					0.018
					(0.09)					(0.42)
Constant	-0.161	-0.142	-0.171	-0.153	-0.152	-0.121	-0.099	-0.116	-0.119	-0.083
	(0.95)	(0.88)	(1.02)	(0.90)	(0.76)	(0.81)	(0.70)	(0.78)	(0.79)	(0.47)
Observations	216	216	216	216	216	216	216	216	216	216

Absolute value of t statistics in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

TABLE 8: Determinants of Entry and Exit Rates with Lags of Entry and Exit – Tobit with Random Effects

	Entry Rates					*Exit Rates*				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Lag of Entry	0.032	0.040	0.013	0.030	0.034	0.350	0.356	0.352	0.355	0.354
	(0.36)	(0.54)	(0.15)	(0.34)	(0.38)	(4.46)***	(4.60)***	(4.55)***	(4.60)***	(4.49)***
Lag of Exit	0.554	0.538	0.543	0.544	0.553	0.184	0.197	0.185	0.200	0.184
	(5.33)***	(5.60)***	(5.09)***	(5.19)***	(5.31)***	(1.68)*	(1.82)**	(1.72)*	(1.84)*	(1.67)*
RER	-0.045	-0.046	-0.042	-0.046	-0.051	-0.021	-0.021	-0.021	-0.021	-0.033
	(1.37)	(1.45)	(1.30)	(1.42)	(1.25)	(0.70)	(0.71)	(0.71)	(0.71)	(0.89)
KL	0.014	0.015	0.017	0.014	0.014	0.006	0.006	0.005	0.005	0.006
	(2.15)**	(2.59)**	(2.44)**	(2.26)**	(2.15)**	(1.13)	(0.99)	(0.83)	(0.94)	(1.13)
Skills	0.009	0.019	0.000	0.014	0.009	-0.043	-0.045	-0.042	-0.048	-0.042
	(0.21)	(0.47)	(0.01)	(0.33)	(0.22)	(1.09)	(1.14)	(1.07)	(1.22)	(1.09)
LTCP	0.001	0.004	0.004	0.004	-0.057	0.004	0.002	0.003	0.002	-0.112
	(0.19)	(0.71)	(0.62)	(0.57)	(0.24)	(0.62)	(0.38)	(0.40)	(0.39)	(0.54)
Advertisement	0.740	0.287	0.160	0.457	0.764	-1.419	-1.241	-1.137	-1.276	-1.357
	(0.45)	(0.19)	(0.09)	(0.28)	(0.46)	(0.88)	(0.78)	(0.71)	(0.81)	(0.84)
Diff. in TFP	-0.002				-0.002	0.001				0.001
	(3.12)***				(3.12)***	(1.41)				(1.40)
Diff. in size		-0.005					0.002			
		(3.68)***					(1.46)			
Diff. in skills			-0.052					0.025		
			(3.30)***					(1.78)*		
Diff. in K/L				-0.002					0.001	
				(3.16)***					(1.70)*	
RER*LTCP					0.013					0.025
					(0.25)					(0.56)
Constant	0.082	0.101	0.053	0.101	0.110	0.094	0.071	0.106	0.089	0.149
	(0.52)	(0.69)	(0.33)	(0.64)	(0.57)	(0.66)	(0.53)	(0.75)	(0.63)	(0.86)
Observations	216	216	216	216	216	216	216	216	216	216

Absolute value of z statistics in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

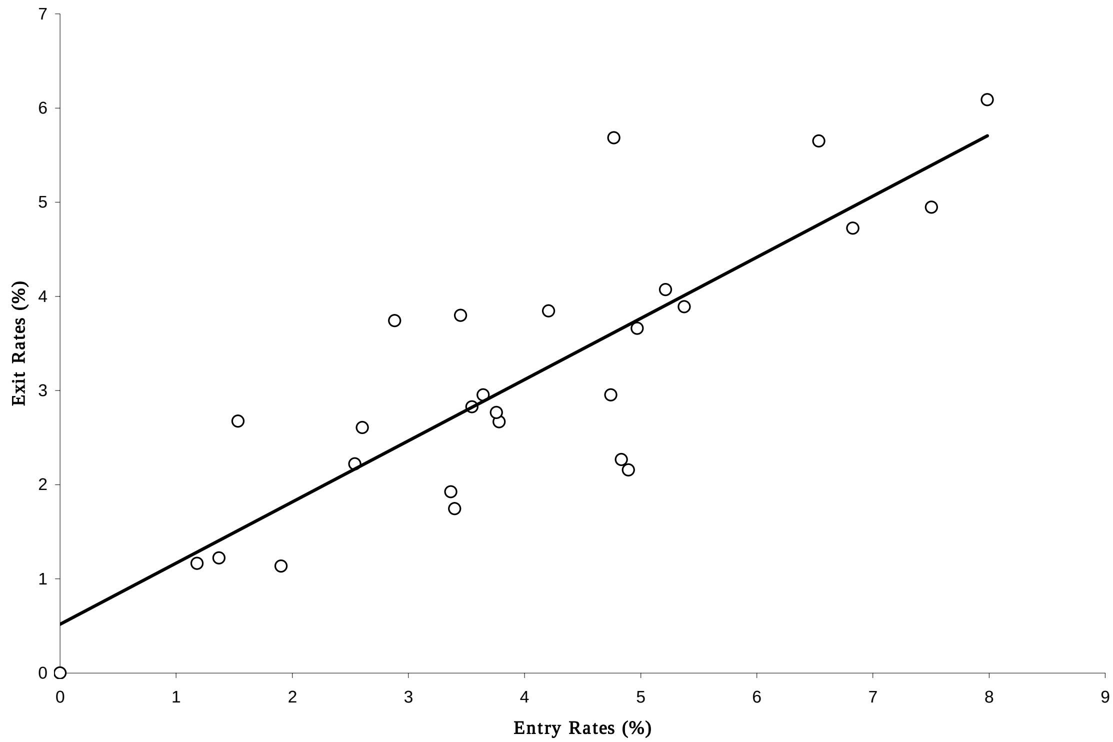

FIGURE 1: Entry and Exit Rates in International Markets, 3-digit ISIC, 1991-99

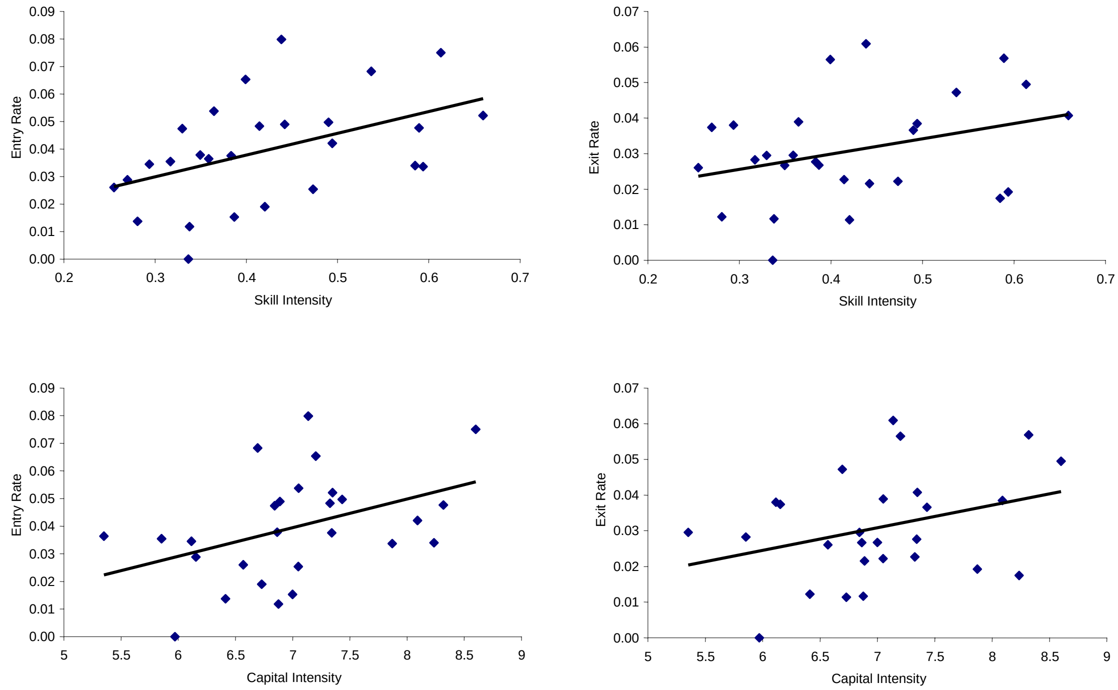

FIGURE 2: Entry, Exit and Factor Intensities, 3-digit ISIC, 1991-99

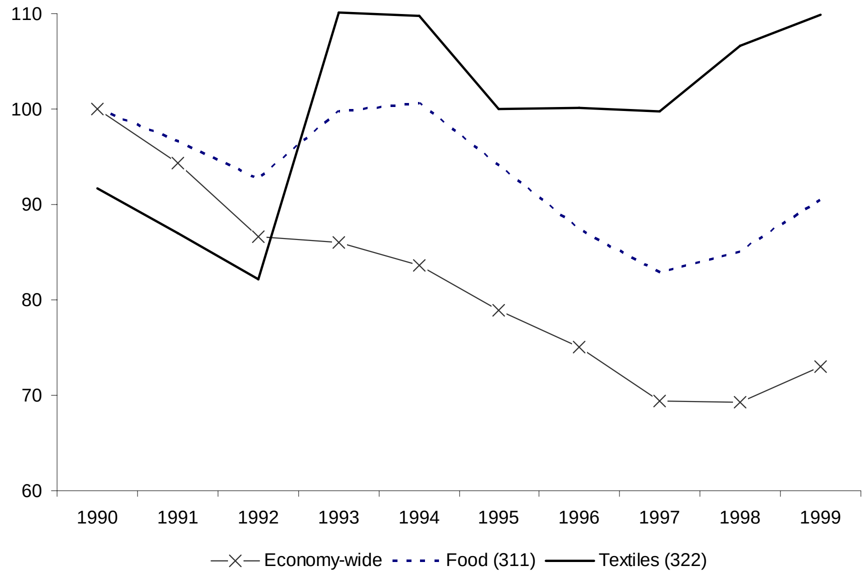

FIGURE 3: Real Exchange Rate: Economy-Wide, Food, and Textiles